

## Paper 2

### Section A: STRUCTURED QUESTIONS (45 + 20 )

Deduct only once ( 1 mark) for units error and (1 mark ) for s.f. errors.

- |   |   |
|---|---|
| <p>1. (a) <math>a = (30 - 0)/20</math><br/> <math>= 1.5 \text{ m/s}^2</math></p> <p>(b) Plot graph correctly to speed = 28 m/s</p> <p>(c) at 29 seconds<br/>         (d) No , car A—travelled 750 m while Car B travelled 700 m.</p>  | <p>1 mark for correct working with<br/>         1 mark for correct units and correct ans</p>  |
| <p>(b) Region X: liquid Y; gas and liquid, Z: gas</p> <p>There is no change in temperature as all the heat energy is used to break the intermolecular bonds between the molecules ( 1 mark) and none is used to increase the K.E. of the molecules ( 1 mark)</p> <p>(c) Any apt insulator material is accepted.<br/>         It is a <u>poor conductor of heat</u> (1 mark) and will prevent heat loss.</p> | <p>1 mark for line leading to speed = 28m/s<br/>         1 mark for line starting from speed= 28m/s to end at 50s.</p> <p>1 mark<br/>         1 mark for correct statement<br/>         1 mark with correct calculations ( 1 mark for correct statement must be supported with valid calculations)<br/>         1 marks for stating how convection current is set up<br/>         1 mark for explaining position with respect to how water of different temp. moves.<br/>         1 mark for all correct states to be correct.<br/>         2 marks for correct explanation</p> |
| <p>2. (a) Since hot water rises and cold water sinks, to set up convection current to warm the whole container, it must be placed at the bottom.</p>  | <p>2 marks for correct explanation</p>  |
| <p>3. (a) (i) Speed of light is <math>3 \times 10^8 \text{ m/s}</math> (1 mark) and it is faster than transmitting through current electricity. ( 1 mark)<br/>         (ii) Microwave oven to cook food.<br/>         (b) (i) <math>f = 3.0 \times 10^8 / 400 \times 10^{-9} = 7.5 \times 10^{14} \text{ Hz}</math></p>   | <p>2 marks for correct explanation</p> <p>1 mark for correct working<br/>         1 mark for correct units and correct ans</p>  |
| <p>(ii) Sun bed for suntanning/ or any other use of UV radiation.<br/>         (iii) Gamma/ x ray</p>   | <p>1 mark for correct ans</p>   |
| <p>4. (a) (i)</p>   | <p>1 mark for correct ans (any)<br/>         1 mark for correct labeling of charges.<br/>         Ok for charge to be drawn inside th sphere.</p>   |

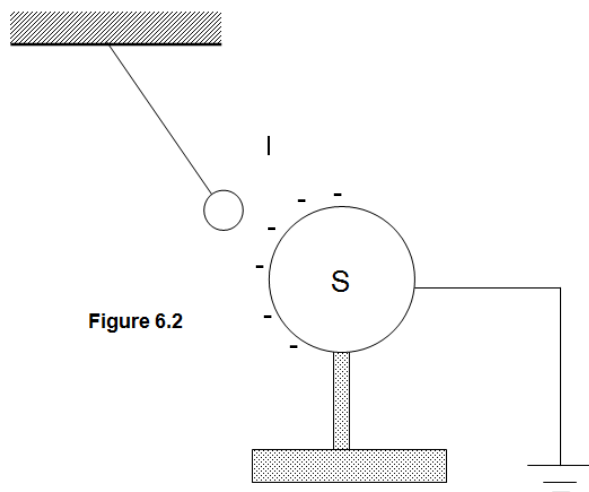


Figure 6.2

(ii) Since unlike charges attract ( 1 mark ), the positively charged ball induces opposite charges ( 1 mark) on the sphere and is attracted to it

(b)  $I = Q/t$

$$0.02 = Q/20 \times 10^{-3}$$

$$Q = 4 \times 10^{-4} \text{ C}$$

5. (a) (i)  $I = 0.30 \text{ A}$

(ii)  $V = 1.2 + 1.7$  ( 1 mark)  $= 2.9 \text{ V}$  ( 1 mark)

(iii)  $E = VIt$

$$= 1.20 \times 0.30 \times 120$$

$$= 43.2 \text{ J}$$

(b) X is anywhere along the circuit except at the parallel set-up.

2 marks for correct explanation

1 mark for correct working

1 mark for correct units and correct ans

1 mark for correct ans

1 mark for correct working

1 mark for correct units and correct ans

1 mark for correct working

1 mark for correct units and correct ans

1 mark for correct ans

## Section B

6. (a) (i) 1. Switch positions to take the timing

2. take more than 2 measurements

3. Take average readings

(ii) Use a data logger/ Exchange role / Take average readings

(iii) Take over a longer distance

(b) (i) Wavelength  $= 1600/40\,000 = 0.04 \text{ m}$

$$(ii) d = 1600 \times 0.1 / 2 = 80 \text{ m}$$

(iii) Water molecules are closely packed (1) and has a higher density (1) than air hence it travels faster.

7. (a)  $I = 1000/250 = 4 \text{ A}$

Also allow adding of power:

2 mark for any two

1 mark for any one

1 mark

1 mark for correct working

1 mark for correct units and correct ans

1 mark for correct working

1 mark for correct units and correct ans

2 marks for each correctly stated.

1 mark for correct working

1 mark for correct units and correct ans

$I = 3000 / 250 = 12 \text{ A}$ , I through one element = $12/3 = 4 \text{ A}$	
(b) Yes, less than 13 A will pass through the circuit. Show current flow is 12 A.	1 mark for stating that total current flow is 12 A and fuse is suitable.
(c) $E = P \times t = 1000 \times 5 \times 60 = 300 \text{ kJ}$	1 mark for correct working 1 mark for correct units and correct ans
(d) Switch X and Y. Both are necessary to complete the circuit for 2 kW	1 mark
(e) Energy = $3 \times 0.5 = 1.5 \text{ kWh}$	1 mark for correct working 1 mark for correct units and correct ans
(f) Cost = $1.5 \times 8 \times 0.30 = \$3.60$	1 mark for correct units and correct ans
(g) Lesser since resistance in parallel is lesser.	1 mark for correct answer with explanation.